UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/525,426	02/23/2005	Veronique Mathieu	13146-00002-US	5752

23416 7590 03/07/2007

CONNOLLY BOVE LODGE & HUTZ, LLP
P O BOX 2207
WILMINGTON, DE 19899

EXAMINER	
NGUYEN, NGOC YEN M	
ART UNIT	PAPER NUMBER
1754	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/525,426	MATHIEU ET AL.	
	Examiner	Art Unit	
	Ngoc-Yen M. Nguyen	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 February 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 19, 2007 has been entered.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 8 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 01/17931 (using Braun et al 6,521,199 as unofficial English translation).

WO '931 discloses a process for regenerating spent onium fluoride-HF adduct (note claim 1 and abstract or Braun '199, claim 1).

A particular embodiment relates to regeneration for multi-step fluorination methods. For many multi-step fluorination methods, the conditions for the required

reaction medium are different. This is the case for the production of sulfuryl fluoride from sulfuryl chloride, for example. It has been found that the second fluorination step, that of converting the sulfuryl chlorofluoride to sulfuryl fluoride, proceeds satisfactorily only if the sulfuryl chlorofluoride starting compound is obtained from an adduct of onium fluoride and HF in which the ratio of amine to hydrogen fluoride does not exceed 1:3.5. In contrast, the first step involving the fluorination of sulfuryl chloride to produce sulfuryl chlorofluoride is independent of the hydrogen fluoride content in the reaction medium.

For the production of sulfuryl fluoride, spent adduct is regenerated in first reactor using a large excess of HF while the sulfuryl chloride present in the reactor is simultaneously fluorinated to produce sulfuryl chloride fluoride. In this regard, it is not necessary to convert all the sulfuryl chloride. After regeneration, the hydrogen is distilled off to bring the amine to HF ratio to the desired value of less than 1:3.5. The reactor contents can either be further reacted to produce sulfuryl fluoride or transferred to another reactor to carry out the reaction (note paragraph bridging page 4-5 or Braun '199, column 3, lines 37-65).

WO '931 clearly teaches that the sulfuryl chloride is converted first to sulfuryl chloride fluoride and then the sulfuryl chloride fluoride is converted to sulfuryl fluoride in a second step.

WO '931 also discloses that the process can be carried out at a temperature range from -20 to 200°C (note claim 4 of WO '931 or claim 6 of Braun '199). The upper limit of 200°C is well within the claimed range of "at lest 150°C".

The process of WO '199 anticipates the claimed process.

Claims 1, 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Braun '199.

Braun '199 discloses a process as discussed in the above rejection.

The process of Braun '199 anticipates the claimed process.

Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Woole et al (3,687,626).

Woole '626 discloses a process for the production of sulfuryl fluoride which comprises reacting a sulfuryl compound selected from the group consisting of sulfuryl fluoride, sulfuryl bromofluoride and sulfuryl chlorofluoride with ammonium bifluoride (note claim 1). The ammonium bifluoride as disclosed in Woole '626, NH_4HF_2, is considered as $NH_4F \cdot HF$ or a HF-containing compound. The temperature for the process of Woole '626 is within the range of about 30°C to about 220°C for producing sulfuryl fluoride (note column 2, lines 16-18). The upper limit is well within the claimed range of "at lest 150°C".

The process of Woole '626 anticipates the claimed process.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO '931 or Braun '199, either one in view of Bisignani et al (3,320,030).

WO '931 or Braun '199 discloses a process as stated in the above rejection.

In WO '931 or Braun '199, a two-step method is disclosed for producing sulfuryl fluoride. In the first step, sulfuryl chloride fluoride is produced and in the second step, sulfuryl chloride fluoride is converted to sulfuryl fluoride. This fairly suggests that only sulfuryl chloride fluoride is the desired reactant for the second step and one of ordinary skill in the art would optimize the amount of sulfuryl chloride fluoride in the reactants to obtain the desired product.

WO '931 or Braun '199 does not disclose the specific conditions for the process, such as temperature and pressure, etc. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to optimize the process conditions through routine experimentation.

Since the starting material in WO '931 or Braun '199 is sulfuryl chloride, it should be substantially devoid of chlorine and hydrogen chloride as required in the instant claims. It should be HCl would be a by-product in the reaction between the sulfuryl chlorofluoride and HF, therefore, the presence of HCl in the reactants should be minimized to push the reaction toward making the products. WO '931 or Braun '199 also teaches that the easy expulsion of HCl gas is desirable (note WO '931, middle paragraph on page 4 or Braun '199, column 3, lines 3-5).

WO '931 or Braun '199 teaches that it is advantages to carry out the regeneration in an autoclave or pressurized vessel with the addition of HF at an elevated temperature ranging from 80 to 120°C, *for example* (note page 2, second full paragraph of WO '931 or paragraph bridging column 1-2 of Braun '199, emphasis added). It should be noted that the teaching of WO '931 or Braun '199 should not be limited to the exemplified temperature. Furthermore, since the process can be carried out under pressure, it would have been obvious to one skilled in the art to optimize the temperature and pressure in the process of to sufficiently form sulfuryl fluoride.

When the sulfuryl fluoride is produced by the two-step process as mentioned in the above rejection, it would have been obvious to one of ordinary skill in the art to optimize the temperature and pressure for each individual step in order to produce sulfuryl chloride fluoride in the first step and sulfuryl fluoride in the second step.

The difference is WO '931 or Braun '199 does not disclose the use of a catalyst.

Bisignani '030 discloses a process for producing sulfuryl fluoride and or sulfuryl chlorofluoride by reacting HF, chlorine and sulfur dioxide (note claim 1 and the chemical equation in column 1). Bisignani '030 teaches that the presence of a solid catalytic material comprising a major weight proportion of activated carbon can help promote the reaction (note claim 1). Bisignani '030 can be applied to teach that in order to minimize difficulties in the product recovery system, which might arise out of the presence of excess chlorine, an excess of chlorine over theory is not desirable (note column 3, lines 56-61). This fairly teaches that unless chlorine is required for the reaction, its presence

in the product is not desired and one skilled in the art would optimize the process condition in order to minimize the presence of chlorine in the final product.

Bisignani '030 can also be applied to teach the known and convention temperature range of 175-325°C for producing sulfuryl fluoride (note column 4, lines 8-15) and pressure range of 2-20 psig (note column 4, lines 58-62).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to carry out the process of WO '931 or Braun '199 in the presence of a catalyst as suggested by Bisignani '030 because such catalyst is known and conventional in the art to promote an analogous process.

Claims 1-7, 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Woole '626 in view of Bisignani '030.

For the amount of sulfuryl chlorofluoride in the precursors, since Woole '626 discloses sulfuryl chlorofluoride is a suitable reactant for producing sulfuryl fluoride, it would have been obvious to one of ordinary skill in the art to use solely sulfuryl chlorofluoride as the reactant.

For claims 6-7, note the reasons as stated above.

Woole '626 does not disclose the use of a catalyst.

Bisignani '030 is applied as stated above to teach the use of a catalyst to promote the production of sulfuryl fluoride.

Applicant's arguments filed February 19, 2007 have been fully considered but they are not persuasive.

Applicants argue that Braun '199 discloses that the temperature is from 80 to 120°C, there is no suggestion to have a higher temperature over 120°C, let alone 150°C as is required by Applicants' claimed invention.

As stated in the above rejection, the range of 80 to 120°C is disclosed in Braun '199 as an "example", not an inclusive range. Furthermore, it would have been obvious to one skilled in the art to use higher or lower temperature than the disclosed range dependent upon the pressure used in the process to effectively produce the desired sulfuryl fluoride. It should also be noted that the temperature for the regeneration can be from –20 to 200°C (note Braun '199, claim 6).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoc-Yen M. Nguyen whose telephone number is (571) 272-1356. The examiner is currently on a Part time schedule.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ngoc-Yen M. Nguyen
Primary Examiner
Art Unit 1754

nmn
March 5, 2007